



How eLRODS Protect Payloads

POIWG Face-to-Face #39

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eLRODS Requirements

Purpose

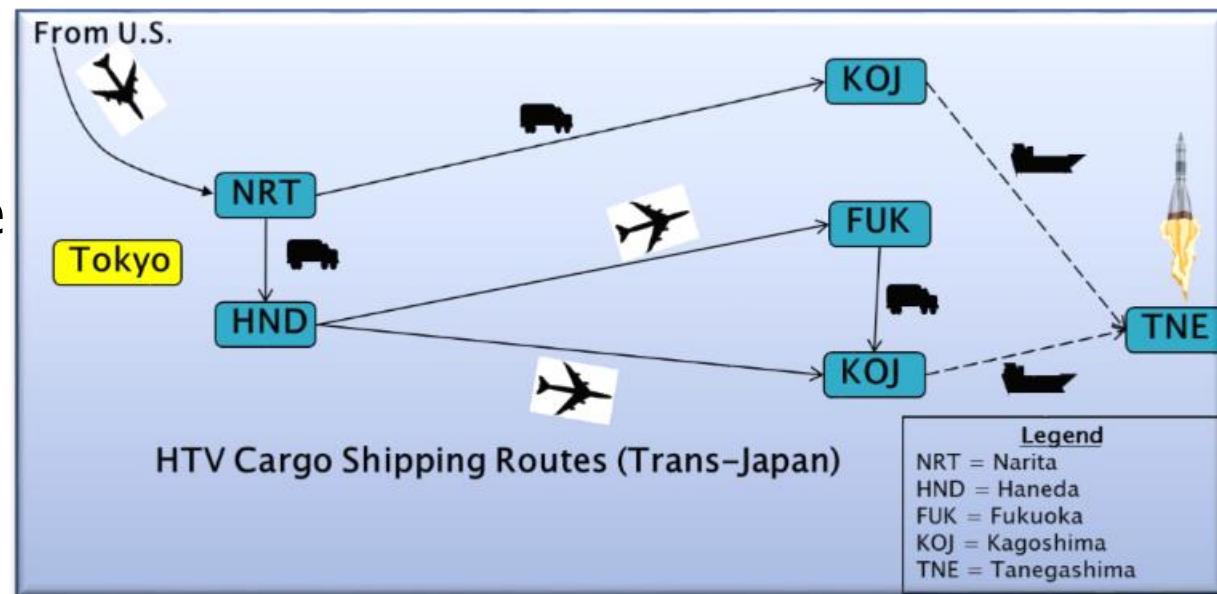
To communicate how eLRODS are used at CMC to protect hardware during receipt, ground handling and delivery of your Science/Cargo to the International Space Station (ISS)

What is an eLRODS

- ▶ Launch, Return and On-Orbit Data Set (eLRODS)
 - ▶ Contains hardware requirements and information which drive cargo processing, packaging, cargo handling, shipping and export control products
 - ▶ Submitted by the hardware sustainer for each manifested flight item
 - ▶ Requirements are imported into the Mission Integration Database Application System (MIDAS), Return Manifest Disposition Plan (RMDP) and tracked in the Hardware Accountability Matrix Report (MAMR)

eLRODS Reduce Risk

- ▶ Incomplete information in a eLRODS can result in Program and hardware risks including:
 - ▶ Damage to hardware
 - ▶ Environmental violations during ground handling
 - ▶ Incorrect packing for shipment or launch
 - ▶ Loss of Science
 - ▶ Increased shipment costs
 - ▶ Negative Work
 - ▶ Shipment delays
 - ▶ Damage to vehicle



When are eLRODS Required?

- ▶ eLRODS for Launch are nominally required at Hardware Audit (On dock–6 weeks)
- ▶ eLRODS for Return are nominally required at Landing –15 weeks

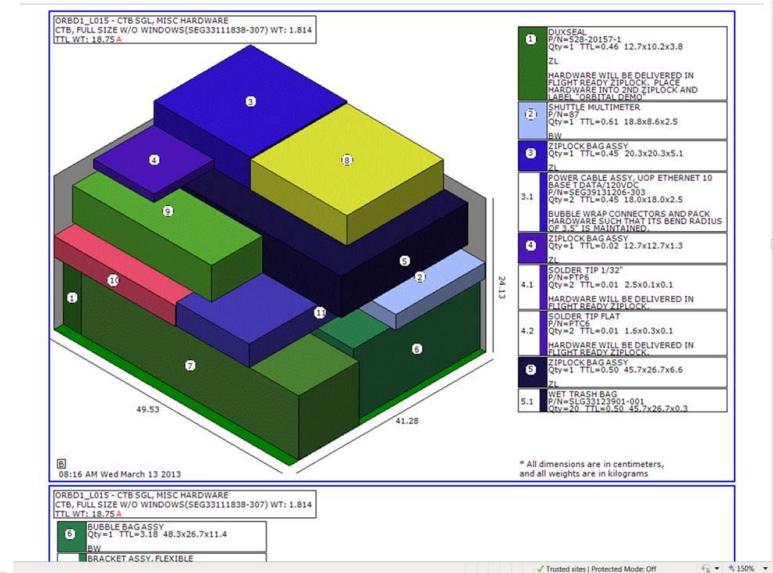
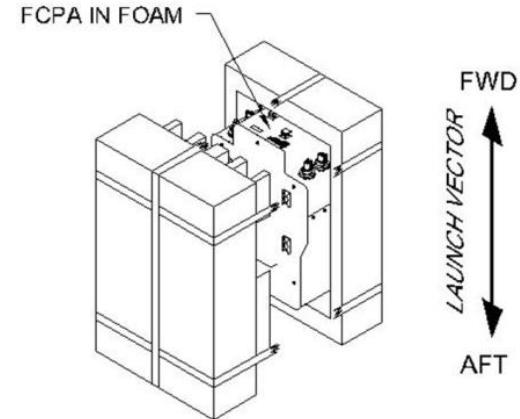
eLRODS Used Across CMC

eLRODS
Support the
following
Organizations
and events at
CMC



Cargo Bag Packing Plan

- ▶ Bag layouts are created by identifying specific eLRODS requirements, such as:
 - ▶ ESD Sensitivity and Protection
 - ▶ Orientation
 - ▶ Launch Vector
 - ▶ Packaging
 - ▶ Bend Radius (hoses, cables, etc.)
 - ▶ Keep Out Zones
 - ▶ Special Foam Requirements
 - ▶ Pressure Vessel
 - ▶ Special Labeling



Hardware Receiving Process

- ▶ When Hardware Arrives On-Dock, eLRODS communicate key handling information, such as:
 - ▶ Procedures for removal and installation of Shipping Container/Fixtures
 - ▶ Initial identification of Hazardous Materials
 - ▶ Keep out zones
 - ▶ Environmental Sensitivities
 - ▶ ESD
 - ▶ Temperature
 - ▶ Humidity
 - ▶ Shock
 - ▶ Weight

Hardware Verifications

- ▶ eLRODS are used during the Hardware Verification Review (HVR) to verify the flight readiness of hardware received
 - ▶ Flight ready packaging
 - ▶ Labeling per ISS Program guidelines (SSP57000)
 - ▶ Ground orientation
 - ▶ ESD Sensitivity and Protection
 - ▶ Cleanliness Levels
 - ▶ Radiation
 - ▶ Bend Radius
 - ▶ Keep Out Zones

Packaging Requirements

- ▶ Hardware is packaged and packed per eLRODS requirements
 - ▶ Cleanliness levels
 - ▶ Bubble-wrap or Ziploc
 - ▶ Special Foam / Foam requirements
 - ▶ Orientation identification
 - ▶ Labeling

Safety Assessments

- ▶ Data from the eLRODS is also used in the Integrated Bag Level Hazard Assessment (IBLHA)
 - ▶ The IBLHA identifies and communicates new hazards created by cargo packed together for each bag
 - ▶ System Safety Reviews:
 - ▶ Hazards (batteries, chemicals, leak rates, radioactive, pressure vessels, etc.) identified from eLRODS for manifested hardware (Begins at Hardware Audit-1 week)
 - ▶ Materials Safety Data Sheets (MSDS)/Safety Data Sheet (SDS) and Hazardous Materials Summary Table (HMST) for hardware in each bag
 - ▶ Coordinates approval with Safety Review Panel (SRP)

Environmental Requirements for Transportation

- ▶ **Temperature**
 - ▶ Temperature controlled shipments
 - ▶ Temperature monitoring devices
- ▶ **Humidity**
 - ▶ Desiccant
 - ▶ Nitrogen Purge
- ▶ **Shock Sensitivities**
 - ▶ Air-ride shipment
 - ▶ Shipping containers
 - ▶ Shock Indicators
 - ▶ Used internal and external
- ▶ **Condensation**
 - ▶ Temperature and Humidity tracking
 - ▶ Nitrogen Purge
 - ▶ Desiccant



Logistics / Shipping

- ▶ eLRODS are used to determine the Transportation Requirements
 - ▶ Haz/Mat assessments
 - ▶ MSDSs/SDSs and HMST (if substance/quantity varies by flight) required to properly meet DoT regulations
 - ▶ Domestic Transportation Guidelines
 - ▶ 49CFR – Hazardous Materials Regulations
 - ▶ May drive packing (specification/rated packing), declarations or exemptions, special permits
 - ▶ May impact layouts (segregation, quantity limits)
 - ▶ Data needed to support PRR
 - ▶ International Transportation Guidelines
 - ▶ International Air Transportation Association (IATA)
 - ▶ Hazardous/Dangerous Goods Regulations
 - ▶ Customs declarations of goods



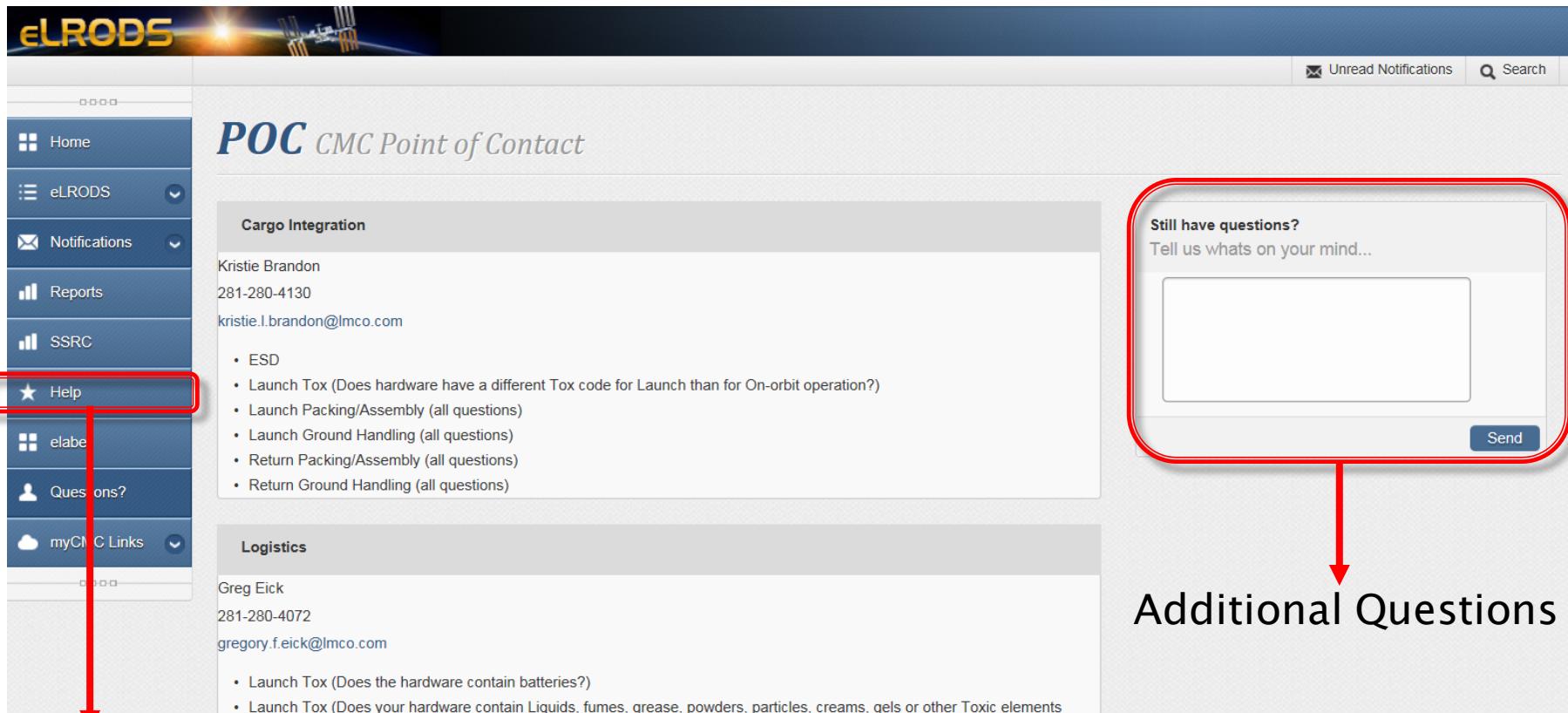
Modes of Transportation

Truck, Passenger Air, Cargo Air,
Handy Carry, Diplomatic Shipment

eLRODS Phase 2

- ▶ eLRODS Phase 2 is in work to improve the tool and expand its capabilities in 2016
 - ▶ Decrease amount of duplicate data entry provided by hardware providers
 - ▶ Expedite creation, review and submittal process
 - ▶ More user friendly change tracking for updates/rejections
 - ▶ Numbering of all fields and additional comment/informational fields
 - ▶ Allow hardware providers to start an eLRODS before its in the part catalog using a temporary number
 - ▶ Significantly enhance the cargo return section
 - ▶ Provide a pull down list of available packaging materials
 - ▶ Add a "Cold Stowage" or "Powered Payload" toggle for launch/return handling requirements to minimize questions required
 - ▶ Create an option that allows submittal of a new record for a duplicate P/N different S/Ns (ex. Nanoracks Module-9)
 - ▶ Allow user to change POC (Primary or Secondary)
 - ▶ New desired reports to be created
 - ▶ Clarify expectations of data being requested by updating information buttons **i**

Contact Information



POC CMC Point of Contact

Cargo Integration

Kristie Brandon
281-280-4130
kristie.l.brandon@lmco.com

- ESD
- Launch Tox (Does hardware have a different Tox code for Launch than for On-orbit operation?)
- Launch Packing/Assembly (all questions)
- Launch Ground Handling (all questions)
- Return Packing/Assembly (all questions)
- Return Ground Handling (all questions)

Logistics

Greg Eick
281-280-4072
gregory.f.eick@lmco.com

- Launch Tox (Does the hardware contain batteries?)
- Launch Tox (Does your hardware contain Liquids, fumes, grease, powders, particles, creams, gels or other Toxic elements)

Still have questions?
Tell us what's on your mind...

Additional Questions

- ▶ Primary CMC POCs (IT, Cargo Integration, Stowage Integration and Logistics)
- ▶ eLRODS Tool is located at the following link
 - <https://mycmc-apps-ext.jsc.nasa.gov/elrods/index.html>

Summary

- ▶ Accurate and timely receipt of eLRODS is critical to
 - Ensuring hardware safety is maintained from receipt at CMC to its arrival on the ISS
 - Meeting ISS delivery milestones

Back Up

eLRODS Questions

- CMC has 4 primary POCs to address, IT, Cargo Integration, Stowage Integration and logistics questions
- Contact information can be found under the “Questions” tab on the eLRODS home page
 - <https://mycmc-apps-ext.jsc.nasa.gov/elrods/poc.html>

IT Tools/Issues accessing eLRODS

- ▶ Juan Moreno-Gongora
281-280-4137 (office)
218-224-9536 (cell)
juan.moreno-gongora@lmco.com
 - Please provide your IP address and the time when you tried to access eLRODS

Cargo Integration

- Kristie Brandon
281-280-4130
kristie.l.brandon@lmco.com
 - ESD
 - Launch Tox
 - Launch Packing/Assembly
 - Launch Ground Handling
 - Return Packing/Assembly
 - Return Ground Handling

eLRODS Questions

Stowage Integration

- ▶ Ken Moulder
281-280-4132
kenneth.moulder@lmco.com

- ESD
- Launch Characteristics (all questions)
- Launch Packing/Assembly (all questions)
- On-Orbit handling (Does the hardware require stowage provisions for on-orbit stowage?)
- Return Tox (Does your hardware contain Liquids, Fumes, Grease, Powders, Particles, Creams, Gels or other Toxic elements (except batteries)?)
- Return Characteristics
- Return Packing/Assembly (all questions)

eLRODS Questions

Logistics

Greg Eick

281-280-4110

gregory.f.eick@lmco.com

- Launch Tox (Does the hardware contain batteries?)
- Launch Tox (Does your hardware contain Liquids, fumes, grease, powders, particles, creams, gels or other Toxic elements (except batteries)?)
- Launch MSDS(s)
- Launch Characteristics (Is the hardware launching under pressure?)
- Launch Characteristics (Does the hardware contain permanent magnets?)
- Launch Ground Handling (all questions)
- Return Tox (Does the Return configuration contain batteries?)
- Return Tox (Does your hardware contain Liquids, Fumes, grease, powders, particles, creams, gels or other Toxic elements (except batteries)?)
- Return Ground Handling (all questions)